59th Medical Wing

Office of the Chief Scientist

Research Highlights

July 2021

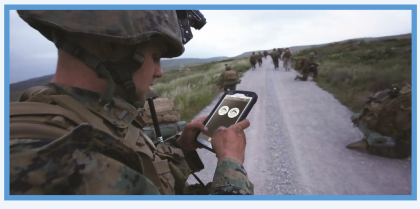
Utilizing Mobile Application for Ocular Disease Trauma

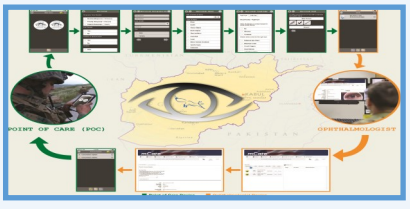
Ocular trauma and disease are common in the operational environment where military personnel have limited communication, no access to ophthalmic care, and few approved and secure options for tele ophthalmology. The incidence of combat ocular trauma (COT) among United States (US) and coalition forces during recent armed conflicts has been reported to be 10-15% of all battle injuries.[1,2] Disease and non-battle injury (DNBI) is also a common cause of ocular morbidity among deployed service members, with a reported rate of 3.35% per year.[3]

There is a need to develop new solutions for military tele ophthalmology to improve and extend care in the expeditionary setting. The current solutions available for military tele ophthalmology are limited and there are none that utilize a mobile application. The primary purpose of this project is to develop and beta test a secure mobile application called Forward Operating Base Expert Telemedicine Resource Utilizing Mobile Application for Trauma (FOXTROT) to improve and extend ophthalmic care in any deployed location. The pilot FOXTROT mApp utilized the Mobile Health Care Environment – Research (MHCE-R) system which was developed by the US Army Medical Research and Development Command (MRDC) Telemedicine and Advanced Technology Research Center (TATRC). The technology is engineered with security and reliability features to make it suitable for an operational environment with low or no connectivity.

The results of beta testing FOXTROT in Afghanistan during 2019 were published in *JAMA Ophthalmology*.[4] In this prospective case series, there were 30 users at 16 military treatment facilities in Afghanistan and 1 location outside of Afghanistan in the CENTCOM AOR that were participants. Users placed tele ophthalmology consults on their mobile phone using the FOXTROT mobile application and an expeditionary ophthalmologist stationed at a military hospital in Afghanistan responded. Users graded the mApp using a 1 to 5 rating scale, with 1 being very dissatisfied and 5 being very satisfied. There were 28 consults placed over 6 weeks by 18 different users that were received by the expeditionary ophthalmologist. Mean initial response time was 3 minutes 58 seconds (95% confidence interval [CI], 2 minutes 30 seconds - 5 minutes 26 seconds). There was agreement between the tele ophthalmology diagnosis and final diagnosis in 24 (86%, 95% CI, 72 - 100%) consults. The treatment and management followed recommendations outlined in the JTS CPG for Eye Trauma: Initial Care in 28 (100%) consults. Tele ophthalmology consultation prevented the need for aeromedical evacuation in 4 (14%, 95% CI, 0.7 - 28%) consults. The patient returned to duty in 15 (54%, 95% CI, 34 - 73%) consults. Median overall satisfaction was 5 (minimum 3, maximum 5). All 28 (100%) consults were secure and HIPAA compliant. While only a limited number of consults were evaluated, this project suggests that tele ophthalmology mobile phone applications like FOXTROT can improve and extend ophthalmic care in combat zones.

To improve and extend ophthalmic care during the COVID-19 pandemic, the FOXTROT solution has also been beta tested at Malcolm Grow Medical Clinics and Surgery Center (MGMCSC) at Joint Base Andrews. There are also plans to add Navy Medical Center Portsmouth and Brooke Army Medical Center as test sites. At MGMCSC, providers in the Emergent Care Center are able to directly consult with the ophthalmologist on call in cases of eye disease or trauma. To date, here have been a total of 61 consults placed. The mean response time during this beta testing phase has been 9 minutes. The COVID-19 pandemic has highlighted the need to expand telemedicine solutions. Tele ophthalmology mobile phone applications can be used for virtual screening, examination, and treatment of patients in an expeditionary environment or during an infectious disease outbreak.





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